

**Bioterrorism:
Homeland Defense:
The Next Steps
An Executive Summary**

of the RAND Symposium

February 2000
Santa Monica, CA, USA

Edited by
Maurice Eisenstein
Brian K. Houghton

Sponsored by

RAND
Battelle Memorial Institute
Sandia National Laboratories
Los Alamos National Laboratory
Los Angeles Sheriff's Department
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An Executive Summary

of the

RAND SYMPOSIUM PROCEEDINGS

BIOTERRORISM: HOMELAND DEFENSE:

The Next Steps

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Complete Conference Proceedings, Executive Summary, and a list of Symposium participants appear on the RAND Web Site <http://www.rand.org/natsec/bioterr.html>

The Conference Proceedings and Executive Summary are also available at
<http://www.rand.org/publications/CF/CF155>

PREFACE

For many years, the United States has been concerned about domestic acts of terrorism using conventional weapons and explosives. More recently, these concerns have grown to include other weapons of mass destruction (WMD), particularly use by terrorists of chemical and biological weapons. Recent independent assessments have concluded that as a nation we are ill-prepared to deal with such events. This Symposium, focused on the Los Angeles area, was held to help remedy that situation by seeking to identify the elements of an integrated homeland defense against Bioterrorism, identifying critical gaps in current federal, state, and local government policies, programs, and capabilities, and offering suggestions on how a relatively cost-effective homeland defense program might be achieved.

This Symposium was organized and hosted by RAND with assistance from the staff of the many sponsoring organizations, and particularly by the Los Angeles County Terrorism Early Warning Group (TEWG).

Speakers included experts from all levels of government and the private sector. Nobel Laureate Dr. Joshua Lederberg of Rockefeller University, and Mr. Brian Jenkins, noted RAND expert on terrorism, gave invited luncheon talks. Mr. Jenkins also gave a wrap up talk at the Symposium's end. Ms. Cindy Conlon of RAND and ASIS (American Society for Industrial Security) was the Symposium Moderator. Opening remarks for this Symposium were given by Dr. Jeffrey Isaacson, Vice President, RAND, Mr. Dallas Jones, Director of California State Emergency Services, and Dr. James Wilburn, Dean, School of Public Policy, Pepperdine University.

This document is comprised of highly condensed summaries of each of the talks presented at the Symposium held on February 8, 9, and 10, 2000 at the Four Points Hotel in Santa Monica, California. The entire Proceedings of the Symposium, as well as the names and associations of participants, can be found on the RAND National Security Web Site

<http://www.rand.org/natsec/bioterr.html>.

The Conference Proceedings and Executive Summary are also available at the RAND Publications web site <http://www.rand.org/publications/CF/CF155>.

Symposium Sponsor Listing

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ACKNOWLEDGMENT

The success of the BIOTERRORISM: HOMELAND DEFENSE: The Next Steps Symposium also came from the support of many who worked behind the scenes and whose names are not listed elsewhere. They include Deputy Mark Siebel, of the LA County Sheriff's Office, who provided security; the crew from that Office who videotaped the entire Symposium; Mr. Tim Lee of RAND who aided in the planning for the food and venue; and Ms. Pat Clark, who handled the finances and kept things legal. I would also like to thank Ms. Suzanne Stahl, my secretary at RAND who sent the invitations to Symposium participants and other correspondence and assisted in transcribing the audio tapes of the Symposium talks. Ms. Linda Standly of RAND who assisted in many ways to prepare for the Symposium, but also graciously greeted the participants and helped assure that the Symposium process ran smoothly over the three days. Ms. Gail Yeaple of RAND who assisted in coordinating transcription of audio tapes, formatting drafts, and establishing the RAND web site.

Planning for the Symposium was conducted over many months with advice and assistance from many including: John P. Hinton of Sandia National Laboratories; Sgt. John Sullivan of the Los Angeles County Sheriff's Office; Dr. Scott Layne of UCLA; Ms. Cindy Conlon of RAND; Dr. Ben Garrett of Battelle; Dr. Dennis Imbro of LLNL; Mr. Jon Kemp of Pepperdine University; Dr. Jim Doyle of LANL; and Dr. John Celentano of L.A. County Health, and of course, all the panel chairpersons.

And a special acknowledgment goes to Brian Houghton of RAND for his support, past and present.

Maurice Eisenstein, RAND
Symposium Coordinator

INTRODUCTION

As noted in the Table of Contents, five separate panels were established to discuss the various components of a homeland defense against bioterrorism. A committee of sponsor representatives selected the panels and the subjects the panel speakers were to address. The selection of the panel speakers, however, was left primarily to the discretion of the panel chairpersons. In some instances, modifications to the subjects covered by the panels were made by the panel chairpersons. Thus, it will be noted that some of the panel presentations are broader in content and go beyond the subject that the panel was originally intended to cover. It was recognized by the Symposium sponsors that there were many important homeland defense-related issues, some noted here and others in the full transcript on the RAND web site, that we were not able to address either for lack of time or availability of an appropriate government or civilian expert.

An objective of the Symposium was to bring together federal, state, and county officials and experts from the private sector to focus on homeland defenses against bioterrorism as may be needed in Los Angeles County. It is recognized that for any such defenses to be effective, they must be coordinated between relevant agencies within each level of government. The speakers and the participants selected for the Symposium, thus, represent a variety of agencies at all levels of government. (See the RAND web site for a listing of the participants.)

The summaries of the Symposium presentations published here were prepared by the editors with the intention of capturing the essence of the more important issues raised in the original presentations. A complete edited transcript of each talk can be found on the RAND web site.

* Complete transcripts of each talk are being placed on the RAND web site as they are received after editing from each speaker.

**Executive Summary
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The Next Steps

OPENING REMARKS

Jeffrey A. Isaacson, Ph.D., Vice President, RAND, Opening Remarks

On behalf of RAND, I am pleased to welcome you to this Symposium. We are honored to be part of a distinguished list of co-sponsors, including the Los Angeles County Sheriff's Department, the Los Angeles County Dept. of Health Services, Pepperdine University, Battelle Memorial Institute, the American Society for Industrial Security, and three national laboratories: Lawrence Livermore, Los Alamos, and Sandia. I'd like to thank each of these institutions for helping to make this event possible.

Bioterrorism has emerged as a major national policy issue. It garners increasing attention from Congress, the Executive Branch (including the White House), state and local governments, and – very importantly – the media. As an example, I've brought with me a news report from the Associated Press, which came out last week. I'd like to share parts of this with you. It's dated February 3rd. It begins,

"The scenario: the U.S. vice president visits a southwestern city of 1.4 million people, attending several public events, including a speech at a university. The FBI gets information that a terrorist group, known to have made inquiries on the black market about obtaining the smallpox virus, may target the vice president. Agents decide the information is too vague to pass onto other law enforcement and health agencies. Within two weeks, seven people go to hospital emergency rooms for treatment of severe flu like symptoms, including two with red rashes. Smallpox is diagnosed. The hospital is closed. No one is allowed to leave or enter to protect against an epidemic of the highly contagious disease. Slowly, news about a bioterrorist attack spreads and is later confirmed by the government. The scare creates public panic and civil unrest over vaccine supplies. Within two months, 15,000 cases of smallpox are reported and 2,000 people have died."

As a result of attention like this, significant resources are being applied to combat terrorism in hopes of improving our ability to deter, to detect, to interdict, and if necessary, to respond. But many issues remain unresolved. For example, what is the right balance in preparing for both high-end and low-end terrorist threats? Is an integrated strategy for homeland defense emerging? Are needs at the local level – in particular, those of first responders – articulated clearly and accurately?

This Symposium, among other things, seeks to better understand the terrorist threat, better articulate the needs at the local level, and identify the elements of an integrated strategy. The focus is on the Los Angeles area, where efforts have received national attention – and indeed, praise – and where much can be learned and possibly applied elsewhere.

An impressive array of experts is assembled. I'm certain this will be a productive two and a half days, and I'm very glad RAND is a part of it. Good luck and have at it. I'd like to kick this off by handing it over to Ms. Cindi Conlon who will act as Symposium moderator. Thank you.

**Mr. Dallas Jones, Director of Emergency Services, Office of Governor Gray Davis,
Opening Remarks**

I'd like to thank RAND and the other sponsors for inviting me to speak to you this morning, because I think we are dealing with one of the issues that will be the most important issues facing the nation and California in the next few years--so thank you very much for inviting me to attend.

During the past decade, Californians have been confronted with almost every conceivable type of emergency. We've experienced the most costly earthquake and disaster in our nation's history, the state's most destructive urban civil unrest in the 20th Century, devastating fires in the Bay Area, Southern California, and other parts of the state, as well as flooding that has led to a declaration of major disasters in over 57 of California's 58 counties. I laughingly refer to California in some respects as the Disneyland of disasters. There's only a couple I haven't mentioned that are on the threat matrix of California, and that's volcanoes and tsunamis, if you weren't aware of those potentialities also. As we have for more than 5 decades, emergency management personnel, including emergency medical services, public health practitioners, fire fighters, police officers, and others, have met those challenges. Their ability to meet them time after time is no accident. The protection of lives, property and the environment has been a priority of California's emergency management community. This history extends from the enactment of the Field Act, which set standards for public school buildings after the Long Beach Earthquake in 1933, to development of the standardized emergency management system, which was an outgrowth of the East Bay Hills fire in 1991. It remains a priority today. As we enter the 21st Century, I believe we will continue to face many of these same challenges that we have in the past.

But we'll also face new and complex challenges such as those posed by terrorist acts, and threats of terrorism from a variety of sources. Incidents such as the bombing of the World Trade Center in New York, the Murrah Federal Building in Oklahoma City, and the Olympic Centennial Park in Atlanta, demonstrated that no city in America is immune to acts of terrorism. Let me repeat that. No city in America is immune. These incidents have left indelible marks on the impact of communities and our nation as a whole. The recent cancellation of Millennium festivities near the Space Needle in Seattle is a vivid reminder of how even the threat of terrorism can paralyze or disrupt a community. As a world leader in commerce in terrorism, California is especially vulnerable to these types of incidents and the threat of those types of incidents. Popular attractions that attract large crowds serve as prime targets for those who prefer to obtain their political or social objectives through violence or terrorist acts. High profile events such as the Rose Parade, Rose Bowl, national political conventions place LA and other cities as very potential targets for terrorist acts.

As we move forward in our terrorist response planning, it is critical that each level of government, local, state, and federal, understand that emergency response and recovery are first and foremost local issues.

Responsibility for dealing with consequences of any terrorist incident rests with the targeted city or county, as it does in all other disasters. Because the response and recovery efforts in a terrorist incident may require the participation of personnel that are not normally used in traditional emergencies, planning efforts at all levels must be broad in scope and ensure coordination. Elected officials and emergency managers must insure that every agency involved in response and recovery knows its proper role. Rumors and public reaction to both perceived and actual events will also pose a challenge. It is critical that all levels of government work to coordinate the communication of accurate information to the public and to keep situations in perspective. Studies of emergency public information systems indicate that the public reacts very appropriately without panic when information and instruction from government officials at all levels and all media sources is clear and consistent. Public behavior during the recent millennium rollover is proof positive that that approach works. If you will recall, we had a very consistent message throughout California and all activities throughout the state, hazardous material spills, murders, everything else, was down during that period of time. People reacted appropriately. Fortunately, the standardized emergency management system here in California provides all level of government with a mechanism that will ensure a coordinative response. Unfortunately though, terrorists aren't limited to an arsenal composed solely of assault weapons and makeshift bombs. The use of anthrax, botulism, sarin, and other biological agents will have even more devastating physical and psychological impacts on these targeted cities. The emergency rooms of many of our medical facilities are already overwhelmed with patients, especially those serving are the least fortunate personnel in our communities. A large influx of patients particularly those arriving before their illnesses have been linked to an incident will add to the existing problem. In addition, would be patients, who haven't even been exposed, but are suffering from psychosomatic symptoms will also complicate the response. Fortunately, many of our California hospitals have adopted the hospital emergency incident command system, to insure coordination with other emergency service providers. Many have also incorporated their terrorism annexes into their emergency operations plans. Others plan to deal with terrorist incidents involving biological agents as they would incidents involving hazardous materials. Local health service agencies including the Los Angeles County Department of Health Services have been at the forefront of insuring the preparedness of medical facilities. And I applaud those efforts and others by local government to be on the positive side of the power curve.

As with LA County and others throughout the state, government recognizes the importance of being prepared to support local government if and when a terrorist incident occurs. Under the standardized emergency management system, the role of our office is to support the preparedness response and recovery efforts of those cities and those counties. This is accomplished by coordinating the response efforts of all state agencies to insure adequate resources are made available to those localities in a timely fashion. Our regional offices play an important role in helping to provide that support. We have also established the State Standing Committee on Terrorism or SSCOT, which includes representatives of our office, the state attorney general's office, California Highway Patrol, National Guard, Dept. of Health Services, Emergency Medical Services Authority, Office of Criminal Justice Planning, FEMA, and the FBI. Members of that committee assist local officials in evaluating potential impacts from specific terrorist incidents or threats. They also provide policy advice and recommendations to other state agencies and to the governor's office. We also have taken in OES a number of steps to support local government preparedness activities and to insure a coordinated response throughout the state. In the planning area, we've developed the California Terrorism Response Plan, as well as planning guidance for local governments. Those went out January of last year, one of the first states in the nation, I might add, to do so. The planning guidance of our regional staff law enforcement fire and rescue branches work closely with local governments on terrorism working groups, threat and capability assessments, and exercises.

Our training arm, California Specialized Training Institute, offers courses in field response, emergency management, executives and elected officials, in terrorism activities. Our ongoing programs in HAZMAT, radiological preparedness also helped us support potential terrorism events.

Over the past few minutes, I've provided an overview of the efforts by state and local agencies to prepare for such a critical terrorist potentiality. For the next three days, experts from various disciplines will help you examine the issues related to bio terrorism events. At the end of the conference, I hope everyone will leave with a better understanding of the issues, and particularly the importance of coordination and working within the established systems that have worked so well here in California over the years. I want to thank you again for inviting me to attend, and wish you well on your conference.

James Wilburn, Ph.D., Dean, School of Public Policy, Pepperdine University,
Opening Remarks

Thank you very much. We are delighted for the School of Public Policy to be a part of this very important conference this week, and particularly to be one of the sponsors with the RAND Institute and others.

This is not a new association for us. Although we are a new school, founded three years ago in 1997, our first year we co-sponsored with the RAND Institute a conference on Security in the Pacific Rim in the 21st Century. Then we sponsored a subsequent conference in which we joined forces with the Army War College to consider security in the Mediterranean, a conference we hosted on our campus in Florence, Italy. Again, next month, our public safety and campus security people are hosting a conference on our Malibu campus on the overseas security of the corporate and private sectors. So this is an area in which we are very interested.

Some of you may be graduates of our Police Management Program started some 30 years ago in the business school. We typically meet several alumni of that program in an audience such as this. But the School of Public Policy is particularly interested since we are quite unique among public policy schools in that we have chosen to place a greater emphasis on local and regional policy solutions. Jane Jacobs, the economist, has noted that if you want to understand the economic development of the western world you must look not at nation states, but at regions. Increasingly with advances in technology, transportation, and communication, the importance of regions is even more important. So our School of Public Policy has an entire curricular tract on local and regional policies, responses, and cooperation.

We also have a strong feeling that it is important to nurture creative and innovative ways for the public and private sectors to cooperate. We have defined public policy as going far beyond federal government agencies to include local and regional agencies, but also non-profit organizations such as RAND, and even families and churches. Some of the more effective work being done in the inner city is currently being done by non-profit, faith-based programs. Thus we have sponsored a number of conferences looking at Southern California as a microcosm of the world into which we are moving. We have also published a half dozen studies which some of you may have seen which look at Southern California in this regard.

So it is an honor for us to be involved. We are delighted to be hosting, together with RAND and others, and look forward to the next three days. Thank you very much.

Section I: THREAT PANEL: *The Threat Beyond 2000*

Panel Co-Chair: Michael A. Wermuth, J.D., RAND

The Gilmore Commission Threat Analysis

In the opening remarks, Mike Wermuth set the framework for the Threat Panel to include a discussion of trends in terrorism: potential terrorist motives, who the perpetrators might be, the devices they might use, and the inherent difficulties with creating a weapon that could cause mass casualties. He described the threat analyses for *The Gilmore Commission¹ Report* that was conducted by RAND, and the concern for some statements in the media that appeared overblown regarding the prospects for bioterrorist acts causing mass casualties. He noted the Report's conclusion that there were likely to be a higher probability of low-consequence bio attacks, and a lower probability for high-consequence attacks based on various factors, but particularly based on the expected difficulty in making quantities of easily dispersed bio agents. Events with a million casualties are highly unlikely for reasons described in *The Gilmore Commission Report*. For that reason, the *Gilmore Commission Report* suggests that there has been too much focus, particularly at the federal level, on preparing for the worst-case scenario under the assumption that all the lesser scenarios would then be included.

Panel Co-Chair: Ms. Suzanne Spaulding, National Commission on Terrorism

Changing Terrorist Objectives

Ms. Spaulding described the Congressional Charter for the National Commission on Terrorism to look at all of the laws, policies, and practices of the U.S. Government to prevent and punish international terrorism directed at the United States. The Commission's focus is on international terrorists and their activity both here and abroad, but not on purely domestic terrorist actors. She described how the terrorist threat and terrorist objectives have been evolving since the mid-70s and 80s, when calibrated violence was meant primarily to force states to make concessions, to the present, where the objectives include simply inflicting massive numbers of casualties. We have to worry about groups that are messianic, vengeful, or ideological.

Today, terrorist groups who seek to inflict massive casualties are more loosely organized, espouse an ideology that transcends national borders that seek to carry on a struggle within their region, kill infidels, or "get the Great Satan." Such organizations are harder to penetrate and raise a greater sense of concern about the likelihood of their use of a weapon of mass destruction to achieve their objective to inflict mass casualties. Ms. Spaulding raised concerns about support to terrorist groups in the future from states that may have little in the way of restraint, or do not have much to lose from giving such support.

¹ *The Gilmore Commission Report* can be viewed at <http://www.rand.org/organization/nsrd/terrpanel/terror.pdf>

Mr. William C. Patrick, III, President, Biothreat Assessments
The Nature of Bioweapons

Bill Patrick discussed some of the principles involved in biological warfare and the relationship among meteorological conditions, delivery systems, munitions, agents, and the effective use of crude weapons. He noted that terrorists who unsuccessfully address any one of those are likely to fail in employing a bioweapon in their terrorist enterprise. He discussed the effects of differences in meteorological conditions such as whether it was an open-air event with wind currents, or in a closed or semi-enclosed environment protected from the wind. He described delivery systems and how they vary in effectiveness, whether the agent is dispersed in a line or as a point source. He described the difficulties inherent in employing liquid agents. Although easier to produce, they are very difficult to disseminate compared to powdered agents, which are fairly difficult to produce in a significant quantity but are easier to disseminate.

Gary W. Richter, Ph.D., Sandia National Laboratories
Lessons Learned from Past Terrorist Events

Gary Richter talked about the lessons learned from the cult organization Aum Shinrikyo's dispersion of the nerve gas Sarin in a Tokyo subway in 1995. Particularly their failure in light of the enormous efforts and resources they put into their chemical and biological weapons development.

One of the lessons learned is that, although the organization grew very rapidly, there was no prior government intelligence about it before their attack. Aum Shinrikyo was a very dangerous organization, had a lot of capability, and if they had been better at designing delivery or weapons systems, they could have caused a major disaster. The good news is the Aum failed to inflict massive numbers of fatalities; the bad news is that no one saw them coming.

It was noted that the Osama bin Laden network has not, to date, employed chem or bio weapons, but has a continuing high interest in the acquisition and potential use of any number of very nasty agents. He noted that agents and weapons could be acquired by fabrication, theft, or even possibly by digging them up at a buried chem/bio weapon disposal site.

Peter Chalk, Ph.D., RAND
The Agroterrorism Threat

Peter Chalk discussed biological agroterrorism—how relatively easier it is to target agriculture than attacking populations, how much less risky it is for the terrorist organizations, and how vulnerable the United States is to such attacks. He discussed the motives that some terrorist and militia groups might have in perpetrating agricultural terrorism, and the potential for critical economic consequences from a major attack on U.S. agriculture. He noted that empirical evidence suggests that terrorists have either used or threatened to use agents to attack agricultural economies in the past. He emphasized that a group that really wanted to, and knew how to do so, could disrupt a particular segment of the United States agriculture by effectively employing biological agents.

Joseph F. Pilat, Ph.D., Los Alamos National Laboratory
An Overview of the Bioterrorism Threat

Joe Pilat noted that the discussion of the existing threat during this symposium has been less apocalyptic and frightening than he has heard elsewhere. Technological advances are likely to change the threat dynamics in the future, but for now bioterrorism is not likely to rise to the level of an apocalyptic event. Given the known intent of some terrorists, designing significant defenses against the use of biological weapons is still important. From the standpoint of today's terrorists' preferences, he noted that conventional weapons do very well. Old known methods work, and we should not expect terrorists to change their methods dramatically.

He raised fears about the diffusion of technology, the great wealth of information on bioagents that is now available from any number of sources, the collapse of the Soviet Union and the weakened Russian economy, the erosion of political barriers, and other collapsing nations, and as well as integrated effect these factors might have on the perfection and use of biological weapons by terrorist groups in the future. He also expressed concern about public reaction to all of this and the possibility of some self-fulfilling prophecy to this discussion about terrorist operations. He summed up by noting that we need continuing and ongoing threat, risk, and vulnerability assessments and that as a nation, we need not only develop a coherent national strategy for dealing with bioterrorism, but for other terrorist problems as well.

Section II: PRE-ATTACK PANEL: Prevention and Deterrence

Co Chair: Miriam E. John, Ph.D., Sandia National Laboratories
The Need for a Homeland Defense Strategy

Dr. Mim John noted that we do not have a national strategy to deal with the threat of bioterrorism and that we are still thinking about the bioterrorism problem mostly in terms of a chemical attack. She argued that we are trying to build our defenses, which are limited against bioterrorism attacks, with what we have in place to deal with conventional threats. We need to start with a clean sheet of paper, bring all of the actors to the table, and start building the architecture and the framework to attack this problem. Then we need to employ resources to deal with the problem effectively.

Co-Chair: Michael S. Ascher, M.D., F.A.C.P., California Department of Health Services
Coordination among Government Agencies

Dr. Ascher echoed Dr. John's comments and discoursed on the need to improve communications between all levels of local, state, and federal government. He also espoused the need for protocols to determine when and how each relevant agency becomes involved. At what point do the fire and police departments get involved with crowd control, immunization, tracing people, imposing quarantines, and all the other critical problems that must be dealt with if there was a serious bioterrorist attack. The public health system could be overwhelmed.

Dr. Ascher questioned whether some of the federal programs currently under way were of any significant utility for biological defenses and whether some federal agencies were reticent or sufficiently prepared to undertake a serious role in the preparation of such defenses. He congratulated Los Angeles and RAND for what they have done in bringing this group together and noted State representatives gained a lot from the Symposium.

Dr. Roger Breeze, United States Department of Agriculture
USDA's Role in Preventing Agroterrorism

Dr. Breeze described how the USDA monitors domestic food production and imports to the United States from around the world. That safeguard system may be far from sufficient, however, to deal with the purposeful contamination of animal and plant foods. He explained how the accidental or unintentional contamination of meat and plant products could lead to billions of dollars in losses to a nation's agricultural industry, as recently occurred in England with the outbreak of "Mad Cow Disease."

Dr. Breeze described how the USDA is organizing the agency in accordance with recently issued Presidential Directives, to begin dealing with the prospect of agroterrorism in the U.S. While the USDA does not have a national security plan, it has begun to develop one. The

USDA has had no past intelligence function but is cooperating with the U.S. intelligence community to help focus on collection efforts to help counter agroterrorism. It is looking at the global threat, who and what might be involved, and what kinds of agents and technologies we should be most concerned about.

He noted that agroterrorism can generally be expected to occur in rural areas where there may be a limited government infrastructure to deal with such problems. While the USDA has launched an effort to counter agroterrorism, they have much to do and no funds at present to deal with terrorism.

Mr. Robert A. Kellison, Federal Bureau of Investigation
The Role of the FBI

Mr. Kellison described how the FBI derives its authority as the lead Federal agency for the investigation of terrorist threats and response to terrorist incidents. However, the FBI recognizes that jurisdiction alone is insufficient to mount an effective response to terrorist threats. Terrorism presents unique challenges to government responders in that it brings together criminal activity and intent—traditionally the province of the law enforcement community, and concerns over public health and safety—the domain of the medical and emergency services community.

In Los Angeles, the FBI is working with its regional partners and has been at the forefront of integrating these two traditionally separate spheres for the purpose of crafting protocols and responses for the entire gamut of nuclear, biological, and chemical terrorist threat incidents. As a result, the exceptional interagency relationships established within the Los Angeles area between law enforcement and first-responder communities have provided a model to FBI Headquarters to be emulated in other metropolitan areas.

Ongoing challenges include maintaining high standards of intelligence-sharing and training among agencies, locating and incorporating emerging technologies that would aid in the detection of hazardous materials used in terrorist incidents, and integrating new top-down initiatives such as President Clinton's National Disaster Preparedness Office.

CAPT Christopher Jones, N.P., United States Public Health Service
The Role of USPHS

CAPT Jones described the supporting role the United States Public Health Service (USPHS) plays under the Federal Emergency Response Plan, in association with other federal agencies, in providing a wide variety of health and medical services in times of disaster. The USPHS is involved in helping to develop local infrastructures deal with a bio terrorist event including the development of the Metropolitan Medical Response System (MMRS), through the office of Emergency Preparedness, which will eventually include some 120 cities around the U.S. The MMRS will be responsible for developing local medical surveillance and response plans. Health and Human Services (HHS) will continue through the Centers for Disease Control (CDC) to look at funding surveillance systems to enhance our capability to identify that a bioterrorist event has occurred and what pathogens were used.

CAPT Jones also described many other emergency actions HHS prepared unilaterally under its own authority or in cooperation with other federal agencies, to take in the event of a disaster that requires resources beyond what local and regional jurisdictions can supply. These include health surveillance, bringing in medical equipment and supplies when local resources are depleted, cooperating with other federal agencies assisting in the evacuation of patients to out-of-area hospitals, and bringing in mortuary teams, along with other medical and health resources.

Carol Peterson, M.D., M.P.H., Los Angeles County, Department of Public Health
The Need for Local Surveillance

Dr. Peterson described Los Angeles County (LAC) Public Health's current capacity, new initiatives, gaps, and next steps to accomplish the objective of timely recognition, appropriate notification, and preparedness planning to ensure an effective response to bioterrorism.

LAC Department of Health Services performs surveillance for over 60 mandated reportable diseases. With assistance from the Centers for Disease Control (CDC), they will enhance county surveillance activities by educating medical providers to recognize the symptoms of bioterrorist-caused disease and the need for prompt reporting. LAC Public Health recently simplified and centralized disease reporting through a campaign that publicized reporting via telephone, fax, or e-mail. Electronic laboratory reporting will be piloted this year. As the initial symptoms caused by bio agents may be nonspecific, they plan to conduct syndromic surveillance in emergency departments, and surveillance for unexplained deaths using death registry data with County Medical Examiners. Surveillance for animal illness/deaths will require additional resources.

With additional funding, LAC Public Health will form an outbreak investigation team to conduct rapid identification/prophylaxis of exposed persons and ongoing monitoring of response to control measures. The LAC Public Health Laboratory has molecular diagnostic and broad viral isolation and characterization capacity. It also functions as a Level C laboratory with advanced capacity for rapid identification of a number of the priority agents.

DHS and Public Health coordinate with the Los Angeles County Terrorism Working and Early Warning Groups. Contingency plans for rapidly initiating mass surveillance, epidemiologic investigations, and pre-prepared medical protocols for clinical management of likely BT agents are under development. Also in development is a web-based Health Alert Network for rapid electronic reporting and dissemination of health alerts and educational information to hospitals, medical providers, and public health personnel.

Sergeant John P. Sullivan, LA Sheriff's Department--Terrorism Early Warning (TEW) Group
The Local Need for Intelligence and Warning

Sgt. Sullivan noted that the effective and rapid dissemination of indications and warning to local emergency response agencies is an essential yet problematic element of terrorism management efforts in the United States. There has been an historical gap in information management moving from the federal level, and sometimes from local intelligence units, to the operational level. The Los Angeles County Terrorism Early Warning Group is a multilateral, multidisciplinary effort to monitor open source data to identify trends and potential threats, monitor specific threat information during periods of heightened concern, assess potential targets, and perform net assessments across the spectrum of possible terrorist acts, and to guide decision making during actual events. Los Angeles County contains over 10 million people and is comprised of 88 separate jurisdictions.

Participants in the LA-TEW Group include County emergency, fire, and public health organizations, the local FBI, Los Angeles Sheriff's and Police Departments, Los Angeles Airport Police, security specialists from RAND and the National Laboratories, and many others. Additionally, the L.A. TEW Group has subgroups. One such group develops pre-event playbooks to facilitate responses. A biological terrorism playbook, among others, has already been completed. The LA TEW Group is also preparing Response Information Folders for all key locations and sites that may be subject to a terrorist attack in LA County.

Section III: TRANS-ATTACK: Emergency Response
An Overview of Emergency Response Issues

Panel Co-Chair: Chief Tom Sams, LA County Sheriff's Department

Panel Co-Chair: Scott P. Layne, M.D., UCLA School of Public Health

Dr. Layne described the challenges and raised questions about appropriate responses in case of biological attack, which could lead to a chaotic situation. There may be scarce information, or an avalanche of information, much of it false. It will be initially uncertain as to whether the pathogen could spread out of control. Among responders and health providers there may be a high level of fear caused by not knowing to what they are being exposed. The event is going to come under intense media scrutiny with the potential to cause panic. Multiple diverse government agencies will be asked to address the problem, and each will have overlapping, and perhaps ambiguous responsibilities. The challenge for these agencies will be to craft a timely response and to save as many lives as possible. Time will be of the essence.

A first question to answer is: What agents have been released? Is it bacteria? Is it a virus? Is it a mixture of bacteria and viruses? Then the question is: What are the best therapies for the situation? In traditional medicine, there are developed standards for the best care for an individual. A very different and greater challenge occurs when dealing with a very large number of casualties, and choosing what are the best initial therapies. The appropriate responses are going to have to be figured out within two to three days. There are on the order of a dozen or so isolation rooms, scattered among various hospitals within Los Angeles. In emergency situations hospitals and ICU beds could soon be filled to capacity and possibly even be overrun.

Chief John Penido, Fire Chief City of San Marino
 Representing the Los Angeles Area Fire Chiefs Association
The Role of the Fire Service in a Biological Event

Chief Penido commented on lessons learned from a tabletop exercise held in Los Angeles County in 1999. The exercise scenario included a release of pneumonic plague in an enclosed entertainment venue.

The cornerstone of an effective response to a biological event is surveillance, which hopes to promptly identify an outbreak of disease and correctly assess its magnitude. Critical to meeting that challenge is the rapid diagnosis and treatment of patients who may trickle in to healthcare facilities a few at a time with relatively benign symptoms. Information about a suspected outbreak must be communicated immediately to all levels of the surveillance network.

The first objective of any response to a biological event should be to protect the first responders. This requires adequate supplies of vaccines and personal protective equipment.

The second objective is to promptly provide effective care to victims. An event of significant magnitude will severely impact the medical community's capacity to respond. There will likely be a tremendous demand for pharmaceuticals, ventilators, isolation rooms, intensive care beds and personal protective equipment to protect against the spread of a communicable disease. Those patients not infected with a communicable disease who are only moderately ill could obtain medication at neighborhood distribution sites remote from healthcare facilities. Victims of a communicable disease could be isolated in their homes and medication delivered to them. Tracking all patients from the onset of the outbreak through its conclusion is essential to effective care and meaningful analysis of the results. This may require the use of tracking systems currently in use at the federal level, but not in use locally. Patient information must be shared real-time with all levels of the response.

Los Angeles County and similar jurisdictions need to explore ways to expedite the delivery of resources from all parts of the state and other states to cope with the mass casualties that may result from a biological event.

John Celentano, M.D., Los Angeles County, Department of Health Services
Preparations for Medical Response

Dr. Celentano discussed developing a Metropolitan Medical Response System (MMRS) and a National Medical Response Team (NMRT). Both organizations would play a role in a trans-attack response scenario of a bioterrorism attack.

Detection of a bio event is a major problem, as is the risk of secondary transmission if a contagious agent was used in an attack. The one thing that is different is whether toxins were used. If so, people would start to become very sick within a matter of hours. The Emergency Medical System (EMS) Fire Department would have to respond to deal with and move those victims.

Planning for a large-scale bio terrorist attack raises issues for concern. The transport and hospital management of a large number of contaminated casualties is still a long way from being solved. There are 5,000 firefighters in L.A. County and L.A. City who are being trained to do mass casualty decontamination. We need to assist our EMS paramedics to understand the differences in WMD and what they might be asked to do if a large-scale event occurred. We have prepared pharmaceutical and medical caches for distribution to first responders, paramedics, and to hospitals in the event of a large scale, mass casualty event. The regional National Medical Response Team consists of a small group of health care providers, about sixty people who have been given special training in protection equipment and can manage casualties in contaminated areas. How this NMRT would support a large-scale bio event that did not take place in Los Angeles or Orange County is uncertain. This team has been pre-deployed to the Conference of Seven in Denver, the Nike Games of Portland and the WTO Conference in Seattle, to provide back up health care assistance in case of a large mass casualty event.

Mr. Javed Ali, Research Planning, Inc.
Lessons Learned from Tabletop Exercises

Mr. Ali presented a range of issues associated with bioterrorism tabletop exercises that have been executed under the auspices of the federal government, including the 120-city exercise program created by the 1996 Nunn-Lugar-Domeinici legislation. He presented a brief overview of the exercise and training process, and explained the mechanics behind various national and local Biological Weapons Tabletop Exercises (BWTTXs). His presentation analyzed results from a holistic perspective and discussed issues and key lessons learned from the exercises. He then presented an evaluation of the impact on overall domestic counterterrorism policy.

BWTTXs, whether conducted at the national or federal level, have raised a number of issues that deserve further consideration and immediate attention from concerned policymakers and government officials. Some of the most problematic and contentious issues revolve around medical monitoring and disease surveillance and identification. Without prior warning, notice, or law enforcement/intelligence indicators that a biological attack could take place, the first indicators of a biological attack will occur at the local level. Clusters of sick or severely ill patients may present at local health care facilities, and the rapidity with which local public health and medical communities are able to discern that an unnatural disease is unfolding may spell the difference between alerting local, state, and federal government response entities (and thereby mitigating the effects of a release) or coping with the aftermath of a mass-casualty bioterror event.

Other lessons learned from exercises relate to bio-remediation, quarantine, continuity of government, business resumption, informing the public, mass-patient care (short- and long-term) and transport, medical supply distribution and administration, and law enforcement support to the public health and medical communities. Exercises are designed to raise local awareness that there are resources that the federal government can provide, but it takes time for them to get to a jurisdiction. Exercises are useful because they help jurisdictions or the national government identify resource shortfalls, gaps, and capabilities. Exercises point out that at the national and local levels they need to collaborate in information sharing, developing partnerships, and raising awareness, since the potential exists during an actual bioterror event that a disconnect could arise between officials at the local and federal levels as to who is going to take charge and what assistance could be provided.

Shirley L. Fannin, M.D., Public Health Services, Los Angeles
The Use of the Existing PHS to Respond

Dr. Fannin identified those vital issues that need to be considered in an initial medical/public health response to a suspected terrorist attack. She addressed the importance of rapidly defining the nature of the incident, assembling a response team and assigning tasks, designing a database, implementing a data-flow plan, developing recommendations for control activities, producing information and instruction material to be distributed to all others involved, and the eventual debriefing and summary of the episode. Dr. Fannin went on to detail the many actions and activities her department would undertake if a bioterrorist event occurred. Her staff has

been funded to work out a plan for responding to bio events. Persons put in control of this project, from the department of Health Services, are in the Acute Communicable Disease Control Unit and are responsible for the control and investigation of outbreaks. It's their job to identify unusual events and to design the system that allows them to define an event as unusual. They established a surveillance system that actively collects information on diseases, particularly communicable diseases. They react to those diseases that can be transmitted and can cause greater illness or death, as well as diseases that can be controlled.

Before the bioterrorism threat, they were enhancing their surveillance system and trying to implement computers to get more complete, real-time reporting. She indicated that she feels they haven't succeeded yet but need to concentrate efforts to get better information. They have the structure for doing what is required to respond to a bio terrorist event. They anticipate assigning a headquarters team and a field team to respond to an incident. If there is an event, their department has a 24-hour, 7-day-a-week, schedule with physicians on-call.

Mr. Jerry L. Harper, Los Angeles County Sheriff's Department (ret.)

The Role of Law Enforcement Agencies

Both biological terrorism and natural outbreaks of disease present complex issues for law enforcement agencies. Both are clearly public health emergencies demanding response from the public health and medical communities, and recognition of the issues facing law enforcement agencies is essential. While the law enforcement role in bio-attacks – which are essentially intentional outbreaks – includes both traditional criminal intelligence and investigation, other aspects are frequently overlooked. In the case of bio-attack, criminal intelligence and investigation must be integrated with medical and epidemiological investigations to ensure a comprehensive understanding of the event. In addition to these "crisis management" roles, law enforcement plays a critical role in enforcing quarantines, managing crowds, providing security of medical facilities, health care providers, and shipments of medical supplies. These missions are largely the responsibility of local law enforcement agencies. Rules of engagement for quarantine, force protection and site security issues in bio-events, both intentional and natural, were discussed.

Emphasis was placed on identification of problematic issues, the need to synchronize law enforcement, and public health response for bio-events.

Annette L. Sobel, M.D., M.S., Sandia National Laboratories

Critical Information Needs

Dr. Sobel addressed the need for information that is critical to casualty management in a chemical/biological warfare (CBW) threat environment. Most significant is the pre-operations or preparatory phase of information management and operational readiness. What information does exist may be spotty, not interlinked, and without obvious organization and focus.

Operational information readiness may be segmented into three general domains: medical threat, information management resources, and data input/output. Medical threat assessment includes medical intelligence preparation. Information updates are critical through input data from the field and other sources. Information management tools provide feedback and integration. Special distributed devices could enable effective acquisition and distribution of time-critical information. An example of this approach would be the use of strategically deployed robots (air, land, and sea) embedded with environmental sensors calibrated to detect an aerosol CBW threat. This information could be simultaneously relayed to a medical intelligence and operational command centers. Tactical medical and other resources could be efficiently used in response to validated threat information.

Dr. Sobel's presentation outlined the information requirements, shortfalls, and mission rehearsal issues relevant to the Trans-Attack environment as well as technology areas that may support these needs.

Section IV: POST ATTACK: Recovery and Investigation

Panel Co-Chair: Randall S. Murch, Ph.D., Defense Threat Reduction Agency
Federal Support to Local Agencies

Dr. Randy Murch commented on how important forensic evidence will be to pursue an investigation in the post-attack era starting from time zero. While noting that the LA County Sheriff's Department laboratory is a fine laboratory, he doubted whether they were capable of responding to a weapons of mass destruction (WMD) environment and dealing with contaminated evidence, or dealing with the highly specialized federal assets brought in to investigate. Dr. Murch noted that there was thought being given at the federal level to capabilities that would help investigations at the local and state levels, including bioforensic capabilities. He noted that workshops were being set up to focus on technology support systems for medical surveillance that allow for rapid retrieval of archived information related to bioterrorism.

Panel Co-Chair: Jonathan E. Fielding, M.D., M.P.H., M.B.A., LAC DPH
Some General Comments

There are special issues for the municipal water supply. For example, being able to convince consumers after a waterborne attack, real or alleged, to drink the water or to use the water once proven safe. We need to understand the impact on local businesses in an area of an attack that could be substantial. Will people be willing to purchase their products if they are in an area that has been attacked? Will employees be willing to go back to work? The economic impacts of an event, how long it takes to recover, and what one can do to accelerate recovery is a particularly important issue for consideration in the post-attack period.

Lakshmanan Sathyavagiswaran, M.D., Los Angeles County Coroner
The Role for the Coroner's Office

Dr. Sathyavagiswaran pointed out that the Coroner's Office is often the agency to first identify a problem when there is a death of unknown origin, so they are clearly an important part of the surveillance process. One issue he raised is that the Coroner's Office doesn't have a Level-4 autopsy facility. It is also unclear how many of the personnel who come in contact with the deceased have been immunized and would risk exposure. This leads to the issue of immunization of first responders. Another question is whether the Federal D-MORT Team is capable of dealing with a bio terrorist attack.

He indicated that there needs to be a plan for final disposition of large numbers of fatalities in a smallpox attack and discussed the issue of cremation. Law enforcement help may also be needed in recovering decedents, especially in situations of civil unrest. It appears that we are not as well-positioned as we might be in the event of a substantial number of casualties of unknown or biologic origin and that this area needs more attention.

Ali S. Khan, M.D., Centers for Disease Control
The Need for Detection and Surveillance

Dr. Khan discussed detection and surveillance for bioterrorism and emphasized that bioterrorism is potentially different from routine infectious disease outbreaks because of a short window for effective intervention, the potential for mass casualties escalates as time from the release of the agent grows, and the need for different interagency liaisons.

He discussed key public health roles: 1) preparedness planning, 2) detection surveillance, 3) integrated laboratory diagnostics, 4) well rehearsed response plans, and 5) improved communications at all levels. All these efforts are geared toward the need for quick identification, and then mobilization to either immunize or otherwise treat (or in some cases quarantine), or all of the above. He emphasized that initial detection will almost always be at the local level, as will the response, therefore, it is essential to build local capabilities and capacities to deal with a biological event.

He indicated, "I don't think any of us feel entirely comfortable that we are as prepared as we want to be, and may never be as prepared as we need to be."

He discussed the many facets of surveillance including the need to increase surveillance after learning of an attack. We can never be sure there has been only one agent employed in an attack and surveillance is needed to determine the magnitude of the event. Nor can we be assured that we're seeing a single attack, so we need to spend more time to develop a set of reasonable requirements for an effective post-initial event surveillance program. He supported a need to integrate surveillance of livestock and other animals with human surveillance activities. He suggested we should develop a model program and have the USDA test it with states and with localities like ours.

Mr. David Wilson, Federal Bureau of Investigation
The Role for the FBI

The FBI is the lead-coordinating agency, but David Wilson reinforced the point that no single agency has all the tools necessary to respond by itself to a terrorist incident. A primary strength of the FBI comes from its field offices dispersed throughout the nation. There are four important FBI groups: First, the Counterterrorism Division, which is central, and is the coordinating unit for WMD events. Secondly, the Lab Division who are increasing their capabilities and developing protocols with other federal agencies. Third, the Hazardous Materials Response Unit, and fourth, the Critical Incident Response Group. The FBI is doing a lot of training and providing expertise for their local teams. He indicated the importance of a broad threat assessment process but indicated that, to date, there is little FBI experience with biological pathogens, except via threats, that many in the medical world have had experience with.

Michael A. Wermuth, J.D., RAND
Legal and Issues of Jurisdiction

Mr. Wermuth talked about the many legal issues, including jurisdiction, conflicts of laws, definitional issues, liability, immigration, international laws, when the military should be involved, etc. What was very clear is that sufficient analysis of the relationship between the various federal agencies, state agencies, and localities has not been done.

There are many federal agencies with law enforcement responsibilities. He talked about two specific examples: quarantine and the use of armed forces in responding to terrorism. The federal government has a limited ability to enforce quarantine. They are supposed to only deal with interstate agents or those from outside the U.S., but in the real world the federal government is likely to assert preemption of local authority based on other pressures. There is also likely to be some confusion between the roles of the FBI for crisis management, FEMA for consequence management, and the relative roles and responsibilities need clear definition.

In terms of the armed forces responding to terrorism attack, some in the military are concerned, because the Supreme Court has found that most federally-determined uses of the military are constitutional. An ineffective local response or political concerns could result in pressure to bring in the military.

Ellen Raber, M.S., Lawrence Livermore National Laboratory
Cleaning Up in the Aftermath

Ellen Raber noted that what is most important is that the approach to decontamination (decon) and clean-up criteria depends on the scenario, i.e., whether the event is an outdoor, semi-enclosed or enclosed target area. The point was made several times that public perception and stakeholder issues will drive the clean-up process. In some cases, for example, you may have an agent where time and humidity have eliminated the problem, but you still may need some type of decon before people are willing to go back into a building. Decontamination by natural attenuation needs to be better studied and potentially used as a first option. Risk communication is a critical issue, and we need to do a better job of disseminating information to the public. Improperly handled information could lead people to think there has been a cover-up or an outbreak of an infectious disease rather than a real attack.

She also made the point that economic drivers and inconvenience will influence stakeholders to accept higher decontamination risks than they otherwise would and that it is critical to involve the regulatory agencies and the stakeholders in the decon decision-making process.

She also noted that the Environmental Protection Agency (EPA) has the lead responsibility for environmental remediation, but whether they are always appropriately involved is an open question. Ellen presented a decision process flowchart that showed the key issues and questions to be addressed and the necessary information to obtain following an incident in the civilian sector. This type of approach should allow decision makers to effectively determine whether an actual or potential impact to human and animal health, and/or property, exists and whether any decontamination is actually needed.

Mr. Scott Lewis, Department of Health Services (DHS), Sacramento, CA
The Importance and Role for Public Affairs

Scott Lewis pointed out that the media is interested in making money; therefore, there are no rules. The media's primary interest is in holding their audience; having them stay on a channel or having them come back to the channel after a break. This desire to hold their audience drives their behavior.

In terms of risk communication, when the DHS has to issue warnings and allay fears, it's not easy to provide a calming message. And it's particularly difficult relating highly charged events. Based on past experience, there were lessons that are very germane; i.e., expect the unexpected, provide accurate information early; brief the media early and often, and allay media fears. If they're scared about their own personal safety, you can be sure you're never going to report with calming messages. Make sure your information is consistent, and that it's all part of a predetermined media plan. It is very important to have rumor control. In the event of an emergency or terrorist attack it would be important for people to be able to talk on the phone or listen to someone of authority to get reassurance.

Mr. Lewis stated, "If you don't feed the hungry bear (the media), it will eat you." If the media does not get details from authorities, they will go in search of so-called "experts" to provide content that might be misleading to share with an interested public. He noted that we don't do a very good job of dealing with a broad array of psychosocial effects that could be long term. We need to learn to effectively deal with allaying fears on the one hand, that this won't happen again, and on the other, being realistic that it might.

Section V: TECH PANEL: Homeland Defense Beyond 2000

Panel Co-Chair: Gary C. Salzman, Ph.D., Los Alamos National Laboratory
Opening Comments

Dr. Salzman noted the challenge of being alert to a broad range of agents which require the need for a multiplex detection approach. In an attack, aerosol samples could be of low concentration; therefore high sensitivity will be required with low false positive rates in order to have a credible detection system.

John Vitko, Jr., Ph.D., Sandia National Laboratories
Bio Detectors

John Vitko discussed chemical and biotoxin detection, and showed examples of several hand-held chemical agent detectors used in the military, but noted there was potential for false alarms from other chemicals.

He then described an array of antibody-based bio-sensors at Sandia National Laboratories that are in the early stages of development and look quite promising and ready for testing. He described in more detail the Sandia effort to develop a combined chem-bio hand-held detector, a mobile microchromotography laboratory, that looks at different separation techniques to essentially get a pattern or signature for each of the different agents to be detected, thereby resulting in very low false alarm rates.

Panel Co-Chair: Fred Milanovich, Ph.D., Lawrence Livermore National Laboratory
Bio Detectors

Fred Milanovich discussed a number of candidate technologies for bio-detection. Among them is light spectroscopy, fluorescence detection using photometry, and mass spectrometry, which is not quite as far along but has the promise of not requiring any re-agents. The next technology described was multiplex immuno bead assays to identify a single sample of many agents at once. Its development is being driven by a strong interest in doing multiple assays in hospitals, for example in a blood sample.

Dr. Milanovich described a hand-held instrument that Lawrence Livermore has been developing for very rapid identification of a variety of biological agents. He also discussed the autonomous phosotometer detector, which collects aerosol and does automated sample preparation and immuno bead assays. The multiplex hand-held immuno assays that SRI is developing might well be suitable for first responders, and the testing of the mass spectrometer that Johns Hopkins has developed under Defense Advanced Research Projects Agency DARPA funding will soon be tested in joint field trial. Some detection systems will be appropriate for mutual detection, and others are likely to be useful for forensic analysis.

He noted that there is a whole list of new bio agents that we are not experienced with in the realm of agroterrorism, such as wheat rot, or Hoof-and-Mouth Disease. Criminal assays take time to develop and are not inexpensive to do. Some prioritization has to be established.

Salvatore R. Bosco, Ph.D., United States Department of Agriculture
Bio Detectors for Agricultural Threats

Sal Bosco addressed some of the technologies and threats associated with intentional contamination of food supplies and destruction of crops. He indicated that this can lead to a significant economic problem and cited the British beef problem of Mad Cow Disease a few years back. He described the narrow genetic range of animal husbandry and agriculture that makes us particularly vulnerable to attack. That would not be the case in crops that are grown from a wider variety of seed stock as opposed to the hybrid seeds used now.

He noted 24 different technologies that the USDA is considering for use in detecting biological agents and the means for dealing with them. The users of this detection technology are going to be veterinarians, agricultural field service agents, and agricultural research service laboratories that are or have been set up and are being used as reference laboratories.

Scott P. Layne, M.D., UCLA School of Public Health
High Throughput Analysis Lab

Scott Layne described a high throughput automation laboratory system that could do thousands of sample assays per hour, with data transmitted back to the client for database work, analysis, and fingerprint identification. Essentially this system is the equivalent to about one hundred lab technicians and would be relevant to all phases of homeland defense against bioterrorist attacks. This approach would shorten the time to identify pathogens by days, allowing for a more rapid and effective medical response.

Ellen Raber, M.S., Lawrence Livermore National Laboratory
Technologies for Decontamination

Ms. Raber described some of the existing and emerging decontamination technologies and noted that the types of decontamination methods most likely to be successful are different than those which would be most effective in response to a military and/or wartime incident. Effective decontamination requires the use of re-agents that can be dispersed as solids, liquids, and/or gases, depending on the particular scenario. Effective decontamination also requires effective sampling and verification methods to demonstrate that cleanup goals have been attained. In the final application, decontamination must be defensible to regulatory agencies and to an uninformed public.

Ellen discussed several systems currently under development at the Department of Energy (DOE) National Laboratories. She stated that the optimum method would be a single decontamination system for both chemical and biological agents. It should be non-toxic, non-

corrosive, and easily deployable, thereby insuring effective use by first-line responders. A distinction was made between degradation and detoxification, as opposed to the total destruction of an agent. Detoxification requires less re-agent material than total destruction, thereby reducing the cost and logistic burden for any response team. Consideration should be given to natural degradation, and emphasis should be placed on developing environmentally safe decontamination systems to avoid long-term undesirable impacts.

Section VI: GUEST SPEAKERS AND WRAP-UP

Joshua Lederberg, Ph.D., Rockefeller University

Guest Speaker: *The Diversity of Bioweapons*

Dr. Lederberg described the need for preparation to defend against a biological attack. He indicated that it is critical to be able to rapidly determine that an attack has happened and to identify the agent or agents employed in order to adequately respond to an incident. He noted that prior warning of an attack was not likely; therefore, there was a need to be alert to the fluctuations in the incidence of disease to be able to distinguish between a natural epidemic and a biological event caused by terrorists. One successful attack with biological agents would likely stimulate other terrorist groups to try.

He noted that finding or growing anthrax was not difficult. He raised further concerns for the prospect of the future development of new organisms through genetic engineering, as well as the leakage of know-how from programs in other countries. He further noted his concern for the prospect of different pathogens and toxins that are being genetically scrambled to defeat existing vaccines. There is a need to gain a deeper understanding of the intentions of potential users and what barriers might exist that could preclude the future use of biological weapons.

Dr. Lederberg raised the issue of how U.S. policies could provoke biological weapons attacks by its inappropriate use of anti-agricultural fungi. Also careless bombings that cause serious collateral damage among civilian populations, could stimulate the desire to inflict violence for revenge. While maintaining his concern for the prospect of an attack with biological agents, he called for more subtle leadership in designing sanctions to deter buildup of biological weapons (BW) capacity. Finally, the United States must accept a more positive role in financing, and promoting cooperation and partnership among nations to fight infectious diseases globally.

Mr. Brian Michael Jenkins, RAND

Guest Speaker: *Thinking About a Strategy for Defending Against Bioterrorism*

Mr. Jenkins described the differences in traditional approaches to threat assessment, law enforcement and national security, and deterrent strategies brought about by the prospect of a bioterrorist attack. Noting today's threats often do not match yesterday's organization, the threat of bioterrorism is difficult to assess and impossible to quantify. He noted the lack of a national lead agency, as well as a national strategy and policy to deal with bioterrorism, but various national commissions at the federal and congressional levels have proliferated, supposedly to find some answers to the problem. He was concerned that a major disaster would force the federal government to awkwardly intervene in localities where an event occurred and push local authorities aside, and he commented on the possibility that the Department of Defense (Do D) would become the designated lead federal agency in dealing with bioterrorist attacks.

Mr. Jenkins said that we have to develop strategies for dealing with a major bioterrorist attack that are compatible with uncertainties that are flexible that can rely on dual use resources that are desirable for their contribution to the national good. He estimated that it would take 10 to 15 years to put nationwide capabilities into place that would allow us to respond effectively to a major incident of bioterrorism. He does not believe our ultimate mission is to prevent every death but to hold things together in time of disaster. That requires people working together and Los Angeles provides an excellent example of that.

Mr. Brian Michael Jenkins, RAND
Symposium Wrap Up: *Concluding Remarks*

After listening to presentations for two days, Mr. Jenkins made many comments about the nature of homeland defense against bioterrorism, and suggestions on what needs to be considered to make such defenses effective. His suggestions, succinctly stated, include:

1. The need to focus on bioterrorism, which is significantly different than chemical terrorism.
2. The need to inventory the capabilities of all levels of government to deal with different biological incidents.
3. We need to be more efficient in the use of resources already in place.
4. The ability to respond fast enough with early detection and identification of an event to contain the effects of a biological weapon attack.
5. To adopt best practices as they have been developed here in Los Angeles, or elsewhere. The discussion and dissemination of what works might be institutionalized through the establishment of a Center of Excellence.
6. The need to enhance our local capabilities and resources to deal with a serious bioterrorist event through regional mutual support agreements and mechanisms that are in place to call upon that support in a timely manner is important.
7. In order to respond to a bioterrorist emergency, the government must be prepared to involve civilians such as physicians, nurses, pharmacists, Red Cross volunteers, and others. Their capabilities must be upgraded so that they can recognize an event, be mobilized into response mode, and be prepared to communicate and interact with the public as necessary.
8. The need to consider using relatively inexpensive web-based instruction to educate large elements of the population about biological terrorism.
9. The need to pursue reaching and educating people through schools and volunteer organizations.

*Chair & Speaker Abbreviated Biographical Sketches
(Alphabetical Listing)*

**Bioterrorism: Homeland Defense: The Next Steps
Symposium
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Mr. Ali is a Senior Analyst with Research Planning, Inc.

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Dr. Ascher is the Chief of the Viral and Rickettsial Disease Laboratory of the California Department of Health Services. He is also a Lecturer in the School of Public Health of the University of California, Berkeley.

Salvatore R. Bosco, Ph.D.

Dr. Bosco is the Manager for Bioterrorism Protection Programs for the US Dept of Agriculture.

Dr. Roger Breeze

Dr. Breeze is currently the Associate Administrator of the USDA's Agricultural Research Service.

John Celentano, M.D.

Dr. Celentano is currently the Disaster Medical Officer for the County of Los Angeles Emergency Medical Services Agency and is responsible for the Los Angeles MMRS project, NMRT West, and the Los Angeles DMAT CA-9.

Peter Chalk, Ph.D.

Dr. Chalk is a Policy Analyst working in the Project Air Force (PAF) and NDRI divisions of the RAND Corporation, Washington DC.

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Ms. Conlon, is the Corporate Director of Security at the RAND Corporation and is the Chairman of the Board of the American Society for Industrial Security (ASIS).

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Mr. Eisenstein is a Resident Consultant for the RAND Corporation and is a charter member of the Los Angeles Terrorism Early Warning Group.

Shirley L. Fannin, M.D.

Dr. Fannin is Director of Disease Control Programs in the Public Health Programs and Services, Department of Health Service for the County of Los Angeles and is a member of the Terrorism Early Warning Group.

Jonathan E. Fielding, M.D., M.P.H., M.B.A.

Dr. Fielding is Director of Public Health and Health Officer for Los Angeles County and is a Professor in the Schools of Medicine and Public Health at UCLA.

Benjamin C. Garrett, Ph.D.

Dr. Garrett is Chief Scientist, Chemical/Biological Warfare Defense, with the non-profit Battelle Memorial Institute.

Jerry L. Harper

Mr. Harper retired in January 1999 as the Undersheriff of the Los Angeles County Sheriff's Department.

Brian K. Houghton

Mr. Houghton is a Doctoral Fellow of the RAND Graduate School located at RAND and is a member of the Los Angeles Terrorism Early Warning Group.

Jeffrey A. Isaacson, Ph.D.

Dr. Isaacson is Vice President and Director of the National Security Research Division (NSRD) of the RAND Corporation.

Brian Michael Jenkins

Mr. Jenkins a Special Advisor to the International Chamber of Commerce and a Senior Advisor to the President of the RAND Corporation.

Miriam E. John, Ph.D.

Dr. Mim John is Vice President of Sandia National Laboratories' California Division.

CAPT. Christopher Jones N.P.

CAPT Jones is a Emergency Coordinator for Region IX of the U.S. Public Health Service and serves as a Federal Liaison to 13 cities under the Defense Against Weapons of Mass Destruction Act.

Dallas Jones

Mr. Jones is the Director of the California Governor's Office of Emergency Services (OES).

Ali S. Khan, M.D.

Dr. Khan is currently the Deputy Director, Bioterrorism Preparedness and Response Program, Centers for Disease Control and Prevention, Department of Health and Human Services.

Robert A. Kellison

Robert A. Kellison is a Supervisory Special Agent (SSA) of the Federal Bureau of Investigation.

Scott Layne, M.D.

Dr. Layne is an associate professor of epidemiology at the UCLA School of Public Health.

Dr. Joshua Lederberg

Dr. Joshua Lederberg is Sackler Foundation scholar at the Rockefeller University in New York City. He currently serves on the Defense Science Board, the Threat Reduction Advisory Panel, the CNO's Executive Panel, the Technical Advisory Group for the Senate Select Committee on Intelligence, and chairs a panel of consultants to the USMC ChemBio-Incident Response Force.

Scott Lewis

Mr. Lewis is a Health Program Specialist and Senior Information Officer of the California Department of Health Services.

Fred Milanovich, Ph.D.

Dr. Milanovich is Program Leader of Lawrence Livermore National Laboratory's Chemical/Biological Nonproliferation Program within the Nonproliferation, Arms Control, and International Security Directorate.

Randall S. Murch, Ph.D

Dr. Murch is Director of the Defense Threat Reduction Agency's Advanced Systems and Concepts Office.

William C. Patrick, III

Mr. Patrick is the President of Biothreat Assessments.

Chief John Penido

Chief Penido is the Chief of the San Marino Fire Department, President of the Los Angeles Fire Chiefs' Association, and member of the Terrorism Early Warning Group.

Carol Peterson, M.D., M.P.H.

Dr. Peterson is the Medical Epidemiologist in the Acute Communicable Disease Control Unit of the Los Angeles County Department of Health Services. Dr. Peterson currently heads ACDC's Bioterrorism Preparedness and Response team.

Joseph F. Pilat, Ph.D.

Dr. Pilat works in the Nonproliferation and International Security Division of Los Alamos National Laboratory

Ellen Raber

Ellen Raber is the Deputy Department Head of the Environmental Protection Department at Lawrence Livermore National Laboratory.

Gary W. Richter, Ph.D.

Dr. Richter is a Distinguished Member of Technical Staff of Sandia National Laboratories.

Dr. Gary C. Salzman

Dr. Salzman is the Lead Project Leader for the DOE Chemical and Biological Nonproliferation Program at Los Alamos National Laboratory.

Lakshmanan Sathyavagiswaran, M.D.

Dr. Sathyavagiswaran is the Los Angeles County Coroner and is Clinical Professor of Medicine and Pathology, USC School of Medicine, and Clinical Associate Professor in Pathology, UCLA School of Medicine.

Annette Sobel, M.D.

Dr. Sobel is the Advisor for Civil Support to the Air National Guard and is at Sandia National Laboratories.

Suzanne Spaulding

Ms. Spaulding is the Executive Director of the National Commission on Terrorism.

Sergeant John P. Sullivan

Sergeant Sullivan of Los Angeles Sheriff's is currently assigned to the Emergency Operations Bureau where he coordinates terrorism response programs. He is a member of the Los Angeles County Operational Area Terrorism Working Group and Terrorism Early Warning Group.

John Vitko, Jr., Ph.D.

Dr. Vitko is a Director of Exploratory Systems and Development at Sandia National Laboratories, Livermore, CA.

Michael A. Wermuth

Mr. Wermuth is a Senior Policy Analyst with the RAND Corporation and is the RAND project director for work in connection with the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction.

James R. Wilburn, Ph.D.

Dr. Wilburn is Dean of the newly formed School of Public Policy at Pepperdine University. He is also Professor of Strategy in the Pepperdine University School of Business and Management.

David Wilson

Mr. Wilson is the Unit Chief of the FBI's Hazardous Materials Response Unit.

APPENDIX: Symposium Program Agenda

BIOTERRORISM:

HOMELAND DEFENSE SYMPOSIUM:

The Next Steps

Sheraton Four Points Hotel
530 West Pico Boulevard
Santa Monica, California

February 8, 2000

7:30 a.m. - 8:30 a.m. Registration, Continental Breakfast

Symposium Moderator:

Ms. Cynthia P. Conlon, CPP, RAND/ASIS

OPENING PRESENTATIONS

8:30 a.m. - 8:45 a.m.

Dr. Jeffrey A. Isaacson, Vice President, RAND and
Director, National Security Research Division
Mr. Dallas Jones, Director of Emergency Services, Office of Governor Gray Davis
Dr. James Wilburn, Dean, School of Public Policy, Pepperdine University

THREAT PANEL: The Threat Beyond 2000

Co-Chair: Ms. Suzanne Spaulding, National Commission on Terrorism

Co-Chair: Mr. Michael A. Wermuth, RAND

Presenters:

Mr. William C. Patrick, III, Biothreat Assessments

Dr. Gary Richter, Sandia National Laboratories

Dr. Peter Chalk, RAND

Dr. Joseph Pilat, Los Alamos National Laboratory

Bioterrorism: Homeland Defense: The Next Steps

PRE-ATTACK PANEL: Prevention and Deterrence

Panel Co-Chair: Dr. Michael Ascher, California Department of Health Services

Panel Co-Chair: Dr. Mim John, Sandia National Laboratories

Presenters:

Mr. Robert Kellison, FBI, Los Angeles

Sergeant John Sullivan, Los Angeles TEWG

CAPT Christopher Jones, N.P., US Public Health Services

Dr. Carol Peterson, Los Angeles Department of Health Services

Dr. Roger Breeze, U.S. Department of Agriculture

Guest Luncheon Speaker: Dr. Joshua Lederberg, Rockefeller University
The Diversity of Bio Weapons

TRANS-ATTACK PANEL: Emergency Response

Panel Co-Chair: Dr. Scott Layne, UCLA

Panel Co-Chair: Chief William Sams, LACSD

Presenters:

Chief John Penido, Fire Chief City of San Marino

Mr. Javed Ali, Research Planning, Inc.

Dr. Annette Sobel, Sandia National Laboratories

Speaker: Dr. Roger Breeze, U.S. Department of Agriculture

February 9, 2000

TRANS-ATTACK PANEL: Emergency Response (Continued)

Dr. John Celentano, Los Angeles County Health Services

Mr. Jerry Harper, Consultant

Dr. Shirley Fannin, Los Angeles County Health Services

POST-ATTACK PANEL: Recovery and Investigation

Panel Co-Chair: Dr. Jonathan Fielding, Los Angeles County Public Health Services

Panel Co-Chair: Dr. Randall Murch, Defense Threat Reduction Agency (DTRA)

Presenters:

Dr. Ali Khan, Centers for Disease Control

Mr. Scott Lewis, Dept of Health Services, Sacramento

Ms. Ellen Raber, Lawrence Livermore National Laboratory

Dr. Lakshmanan Sathyavagiswaran, Los Angeles County Coroner's Office
Mr. Michael A. Wermuth, RAND
Mr. David Wilson, Federal Bureau of Investigation

Guest Luncheon Speaker: Mr. Brian Michael Jenkins, RAND
National Commissions Dealing with Terrorism and WMD

TECH PANEL: Homeland Defense Beyond 2000

Panel Co-Chair: Dr. Fred Milanovich, Lawrence Livermore National Laboratory
Panel Co-Chair: Dr. Gary Salzman, Los Alamos National Laboratory

Presenters:

Dr. Gary Salzman, Los Alamos National Laboratory
Dr. John Vitko, Sandia National Laboratories
Dr. Fred Milanovich, Lawrence Livermore National Laboratory
Dr. Sal Bosco, U.S. Department of Agriculture
Dr. Scott Layne, UCLA Department of Epidemiology
Ms. Ellen Raber, Lawrence Livermore National Laboratory

February 10, 2000

WRAP UP SESSIONS: Panel Chairpeople--Summary and Recommendations

Moderator: Dr. Benjamin Garrett, Battelle Memorial Institute

Closing Remarks: Mr. Brian Michael Jenkins, RAND

Symposium Coordinator: Mr. Maurice Eisenstein
RAND 310-393-0411, Extension 6633, Maurice_Eisenstein@rand.org

